

Trough Workshop Thermal Storage Plan

August 17, 1999

Thermal Storage Overview/Status

- Never became an R&D priority for troughs
 - many options considered during 1980's
 - not much done in recent years
- Currently being investigated for Sunray at SEGS I replacement
- Could become very important in near-term with GEF projects as fix for ISCCS problem
- Vital for solar-only plants

Thermal Storage Justification

- Solar-only storage versus combined cycle plant to avoid bottom firing; improve heat rate versus hybrid plant without storage.
- Dispatchability – shift to meet peak (also applies to hybrid combined cycle)
- Increase solar fraction – baseload/solar only.
- Improve utilization of solar energy.
- Increasing output.
- Increasing value of power (displace diesel generator sets).

Thermal Storage Objectives

A.) Fix ISCCS crisis by January 2000

B.) Field test of near-term system by 2002

- meets established cost/performance goals

C.) Initiate storage system for solar-only plant by 2003

Objectives

FY99 00 01 02 03

A.) Fix ISCCS crisis

B.) Near-term system field test

C.) Advanced storage options

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Thermal Storage Activities

- **Objective A: Fix ISCCS crisis by 2000.**
 - 1.) Evaluate benefits of incorporating storage into ISCCS plant design
 - 2.) Look at failure mode & related risks for all realistic ISCCS thermal storage options
 - 3.) Detailed design of promising integrated storage into bottoming cycle – annual operation
 - 4.) Examine scale-up issues from test to project size for ISCCS

Thermal Storage Activities

- **Objective B: Field Test of Near-Term System by 2002.**
 - 1.) Analysis to establish cost and performance goals and feasibility for near-term storage
 - 2.) Conduct failure modes & effects analysis for potential near-term systems (e.g. Caloria & concrete)
 - 3.) Develop conceptual near-term design for established cost and performance requirements
 - 4.) Detailed near-term component & system design
 - 5.) Near-term system component/subscale testing
 - 6.) Field test at SEGS plant (issue RFP)

Thermal Storage Activities, cont'd

- **Objective C: Initiate storage system for solar only plant by 2003**
 - 1.) Define thermal storage requirements for different applications
 - 2.) Establish cost & performance goals & feasibility (e.g. two-phase concrete) for long term systems
 - 3.) Develop conceptual designs for established cost & performance requirements